AMENDMENTS TO THE CLAIMS

1. (Original) A method of controlling a sigma delta modulator with a loop which establishes a signal transfer function and a noise transfer function of the sigma delta modulator, wherein the sigma delta modulator receives an input signal and provides a modulated output signal in response to the input signal; wherein the noise transfer function establishes a maximum stable amplitude for the input signal; wherein the loop comprises a loop filter; and wherein the method comprises the step of

- controlling the sigma delta modulator to change the noise transfer function in response to a signal feature which is correlated with the input signal such that the maximum stable amplitude is maintained so as to stay above the absolute value of input signal;

characterized in that the signal feature is provided from the loop filter.

2. (Original) A method according to claim 1 , where the noise transfer function is changed to suppress quantization noise to a smaller extent when the signal feature represents a relatively large amplitude, whereas when the signal feature represents a relatively small amplitude, the noise transfer function is changed to suppress quantization noise to a larger extent.

3. (Currently Amended) A method according to claim 1 ~~or 2~~, where the noise transfer function is changed while the sigma delta modulator operates in a stable state.

4. (Currently Amended) A method according to ~~any of~~ claim~~s~~ 1 t~~o 3~~, where the loop filter comprises a cascade of more than two integrators.

5. (Currently Amended) A method according to ~~any of~~ claim~~s~~ 1 ~~to 4~~, where shaping of the noise transfer function is controlled by changing filter coefficients of a loop filter to move zeroes or poles in the transfer function provided by the loop filter.

6. (Currently Amended) A method according to ~~any of~~ claim~~s~~ 1 ~~to 5~~, where the loop filter comprises a cascade of integrator stages, and where shaping of the noise transfer function is controlled by changing loss-coefficients of the integrators.

7. (Original) A method according to claim 6, where the loss-coefficients of the integrators are controllably adjustable between a lower value larger than the value zero and an upper value lower than or equal to one.

8. (Currently Amended) A method according to ~~any of~~ claims 1 ~~to 7~~, where the sigma delta loop comprises a quantizer which quantizes an input to the quantizer in N_Q levels, where N_Q is larger than or equal to two levels, but less than six levels.

9. (Currently Amended) A method according to ~~any of~~ claims 1 ~~to 8~~, where the sigma delta loop comprises a quantizer, and where shaping of the noise transfer function is controlled by changing thresholds of a quantizer of the loop.

10. (Currently Amended) A method according to ~~any of~~ claims 1 ~~to 9~~, where the input signal is provided via a pre-filter which is controlled for selected values of the signal feature.

11. (Currently Amended) A method according to ~~any of~~ claims 1 ~~to 10~~ comprising the step of: computing connected values of threshold peak values and selectable loop filter parameters, which are connected in the sense that for a given value of the signal feature, A(n), a nearest lower threshold peak value determines the threshold at which selectable loop filter parameters, when applied to the loop filter, provide a modulator which is stable for values of the signal feature.

12. (Currently Amended) A method according to ~~any of~~ claims 1 ~~to 11~~, wherein the signal feature is the input signal of the modulator, and/or the output signal from the modulator and/or a state variable of the loop filter.

13. (Currently Amended) A method according to ~~any one of~~ claims 1 ~~to 12~~, wherein the signal feature is provided from the loop filter by processing that comprises low-pass.

14. (Currently Amended) A method according to claim 12 ~~or 13~~, wherein the signal feature is processed by a peak detector to provide an intermediate control signal based on which a decision on which control signals to provide for control of the noise transfer function is performed.

15. (Original) A method according to claim 14, wherein the peak detector performs low-pass filtering of the signal feature and subsequently determines the numerical value of the low-pass filtered signal feature.

16. (Currently Amended) A method according to ~~any of~~ claims 14 ~~to 15~~, wherein a running window of N previous samples of the output provided by the peak detector is stored, and wherein a maximum of the N previous samples is selected as the intermediate control signal.

17. (Currently Amended) A method according to ~~any of~~ claims 14 ~~to 16~~, wherein the decision on which control signals to provide for control of the noise transfer function is performed by a lookup table which comprises stored control signals and associated with values or ranges of values of the intermediate control signal.

18. (Currently Amended) A method according to ~~any of~~ claims 1 ~~to 17~~, wherein noise transfer functions which provide a maximum stable amplitude, MSA, located at least approximately 5% above an estimated peak value are selected.

19. (Currently Amended) A method according to ~~any of~~ claims 1 ~~to 18~~, wherein a full-scale range of peak values of the signal feature is divided into a number of ranges, where each range is associated with a selectable noise transfer function.

20. (Currently Amended) A method according to ~~any of~~ claims 1 ~~to 19~~ comprising the steps of: for a given quantizer, determining:

minimum values (Amin) of a noise amplification factor for different loop filters; a maximum stable amplitude value, MSA, which is selected such that input signal values less than MSA will provide a stable modulator;

creating a bank of different loop filters wherein each filter is related to a respective determined maximum amplitude value MSA;

selecting a filter from the bank in response to an adaptation signal which is correlated with the input signal.

21. (Currently Amended) A computer program which when run by a computer performs the method according to ~~any of~~ claims 1 ~~to 20~~.

22. (Currently Amended) A computer readable medium encoded with a program which when run by a computer performs the method according to ~~any of~~ claims 1 ~~to 20~~.

23. (Original) A sigma delta modulator with a loop which establishes a signal transfer function, STF, and a quantization noise transfer function, NTF, of the sigma delta modulator, where the sigma delta modulator receives an input signal, x(n), and provides a modulated output signal, y(n) in response to the input signal; wherein the noise transfer function establishes a maximum stable amplitude for the input signal; wherein the loop comprises a loop filter; and wherein the sigma delta modulator is configured to:

- change the quantization noise transfer function, NTF, in response to a signal feature which is correlated with the input signal such that the maximum stable amplitude is maintained so as to stay above the absolute value of the input signal;

- characterized in that the signal feature is provided from the loop filter.

24. (Original) A sigma delta modulator according to claim 23, where the noise transfer function, NTF, is changed to suppress quantization noise to a smaller extent when the signal feature represents a relatively large amplitude, whereas when the signal feature represents a relatively small amplitude, the noise transfer function is changed to suppress quantization noise to a larger extent.

25. (Currently Amended) A method according to ~~any of~~ claims 23 ~~to 24~~, where the noise transfer function, NTF, is changed while the sigma delta modulator operates in a stable state.

26. (Currently Amended) A sigma delta modulator according to ~~any of~~ claims 23 ~~to 25~~, where the loop filter comprises cascade of more than two integrators.

27. (Currently Amended) A sigma delta modulator according to ~~any of~~ claims 23 ~~to 26~~, where shaping of the noise transfer function is controlled by changing filter coefficients of a loop filter to move zeroes or poles in the transfer function provided by the loop filter.

28. (Currently Amended) A sigma delta modulator according to ~~any of~~ claims 23 ~~to 27~~, where the loop filter comprises a cascade of integrator stages, and where shaping of the noise transfer function is controlled by changing loss-coefficients of the integrators.

29. (Original) A sigma delta modulator according to claim 28, where the loss-coefficients of the integrators are controllably adjustable between a lower value larger than the value zero and an upper value lower than or equal to one.

30. (Currently Amended) A sigma delta modulator according to ~~any of~~ claims 23 ~~to 29~~, where the sigma delta loop comprises a quantizer which quantizes an input to the quantizer in N_Q levels, where N_Q is larger than or equal to two levels, but less than six levels.

31. (Currently Amended) A sigma delta modulator according to ~~any of~~ claims 23 ~~to 30~~, where the sigma delta loop comprises a quantizer, and where shaping of the noise transfer function is controlled by changing thresholds of a quantizer of the loop.

32. (Currently Amended) A sigma delta modulator according to ~~any of~~ claims 23 ~~to 31~~, where the input signal is provided via a pre-filter which is controlled for selected values of the signal feature.

33. (Currently Amended) A sigma delta modulator according to ~~any of~~ claims 23 ~~to 32~~ where the sigma delta modulator is configured to compute coexisting values of amplitude ranges, MSA, and loop filter parameters, which are coexisting in the sense that for a given value of an amplitude range, the coexisting loop filter parameters, when applied to shape the loop filter, provide a modulator which is stable for signal amplitudes smaller than the given value of an amplitude range.

34. (Currently Amended) A sigma delta modulator according to ~~any of~~ claims 23 ~~to 33~~, wherein the signal feature is the input signal of the modulator, and/or the output signal from the modulator and/or a state variable of the loop filter.

35. (Currently Amended) A method according to ~~any of~~ claims 23 ~~to 34~~, wherein the signal feature is provided from the loop filter by processing that comprises low-pass filtering.

36. (Currently Amended) A sigma delta modulator according to claim 34 ~~or 35~~, wherein signal feature is processed by a peak detector to provide an intermediate control signal based on which a decision on which control signals to provide for control of the noise transfer function is performed.

37. (Original) A sigma delta modulator according to claim 36, wherein the peak detector performs low-pass filtering of the signal feature and subsequently determines the numerical value of the low-pass filtered signal feature.

38. (Currently Amended) A sigma delta modulator according to ~~any of~~ claims 36 ~~or 37~~, wherein a running window of N previous samples of the output provided by the peak detector is stored, and wherein a maximum of the N previous samples is selected as the intermediate control signal.

39. (Currently Amended) A sigma delta modulator according to ~~any of~~ claims 36 ~~to 38~~, wherein the decision on which control signals to provide for control of the noise transfer function is performed by a lookup table which comprises stored control signals and associated with values or ranges of values of the intermediate control signal.

40. (Currently Amended) A sigma delta modulator according to ~~any of~~ claims 23 ~~to 39~~, wherein noise transfer functions which provide a maximum stable amplitude, MSA, located at least approximately 5% above an estimated peak value are selected.

41. (Currently Amended) A sigma delta modulator according to ~~any of~~ claims 23 ~~to 40~~, wherein a full-scale range of peak values of the signal feature is divided into a number of ranges, where each range is associated with a selectable noise transfer function.

42. (Currently Amended) An analogue to digital converter comprising a sigma delta modulator according to ~~any of the~~ claims 23 ~~to 41~~.

43. (Currently Amended) A digital to analogue converter comprising a sigma delta modulator according to ~~any of the~~ claims 23 ~~to 41~~.

44. (Currently Amended) A microphone comprising a preamplifier and a sigma delta modulator according to ~~any of the~~ claims 23 ~~to 41~~.

45. (Currently Amended) A class-D amplifier comprising a sigma delta modulator according to ~~any of the~~ claims 23 ~~to 41~~.